Oroville Facilities
FERC Relicensing

SP – T10

Upland Plant Communities

Objectives

- to provide information on the botanical resources relating to plant communities in the project vicinity
- assess the effects of project management and operations on upland plant communities
- provide information that can be used to identify opportunities for protection, mitigation, and enhancement measures

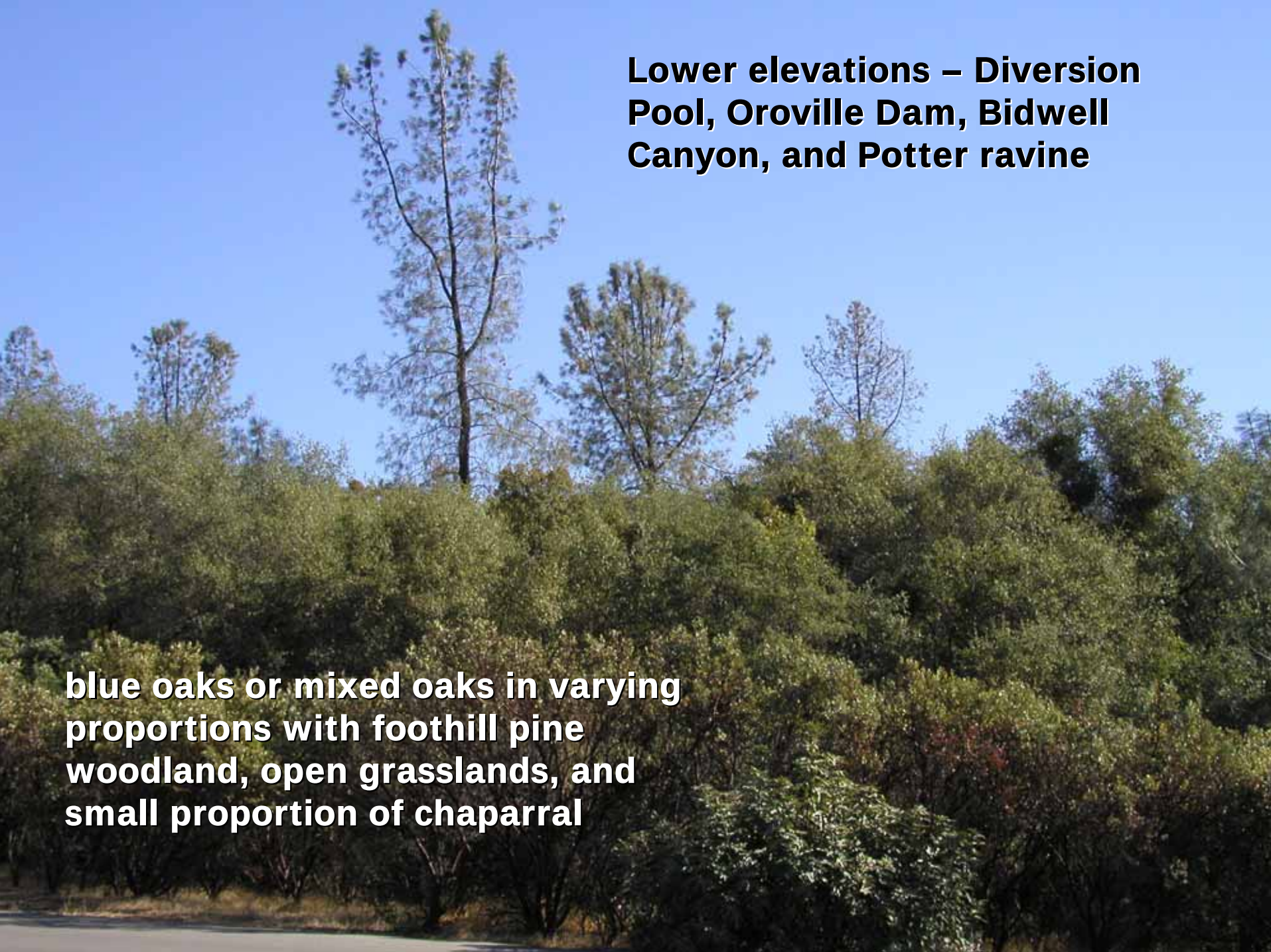
- Task 1 – Existing conditions
  - Vegetation mapping
  - Special status plant species habitat
  - Noxious/invasive species
- Task 2 – Fire suppression and fuels management
  - Ecological role of fire in evolution of plant communities in Project vicinity
  - History of fire suppression
  - Literature review on effects of fire management on species and communities
- Task 3 – Project related activities

Upland vegetation

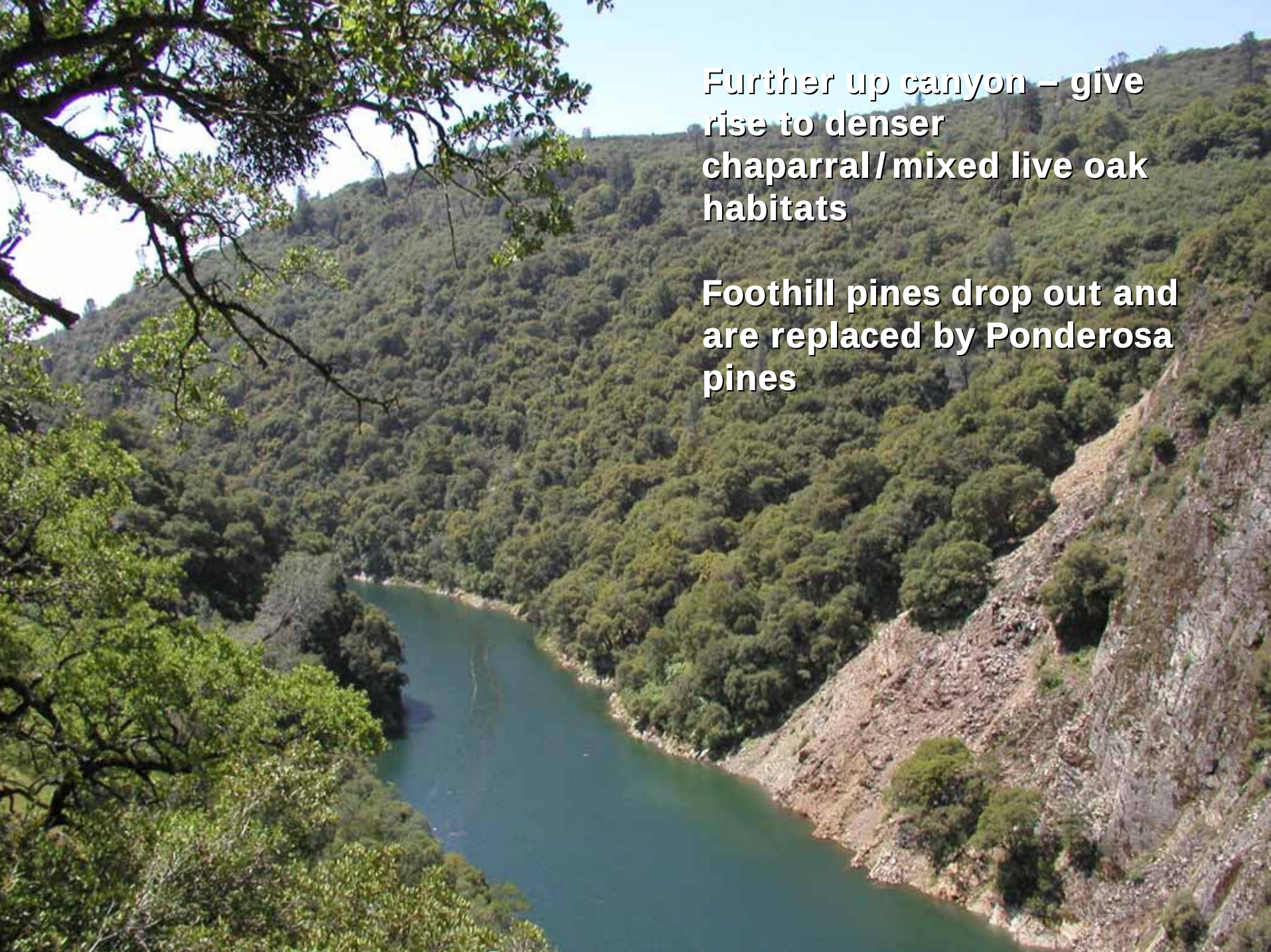
- Vegetation patterns correspond with elevational changes
- Valley grasslands to foothill woodlands to mixed conifer forests
- Within foothill regions, vegetation patterns and associations strongly influenced by slope, aspect, soils, and disturbance history

Upland plant community acreages

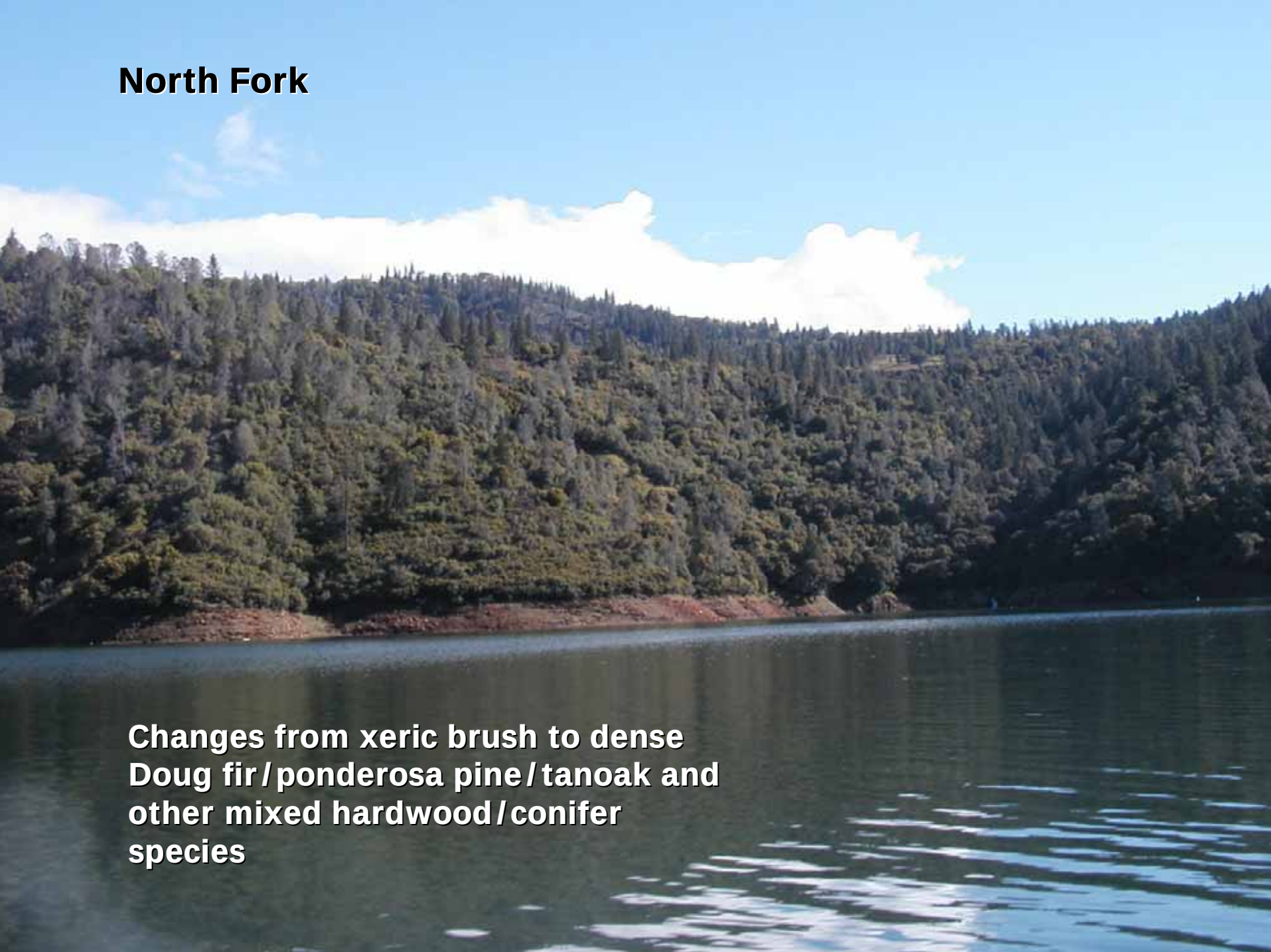
	Project Area (41,000) acres	One-Mile Buffer (100,500) acres
Upland Forest	11,100	62,145
Upland Shrub	232	2,289
Upland Herbaceous	2,752	12,218
Total Acres	14,084	76,652

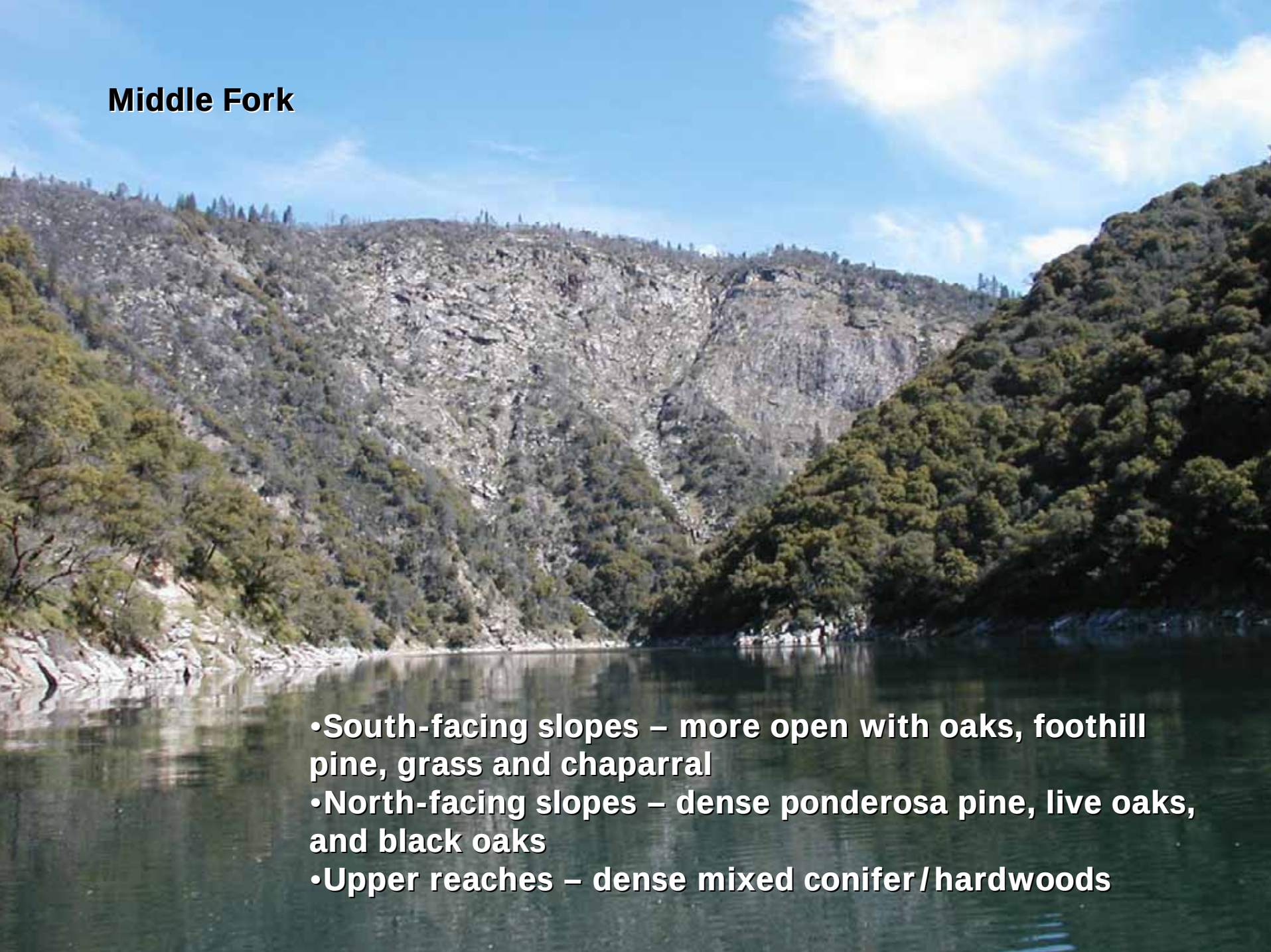

Lower elevations – Diversion Pool, Oroville Dam, Bidwell Canyon, and Potter ravine
blue oaks or mixed oaks in varying proportions with foothill pine woodland, open grasslands, and small proportion of chaparral

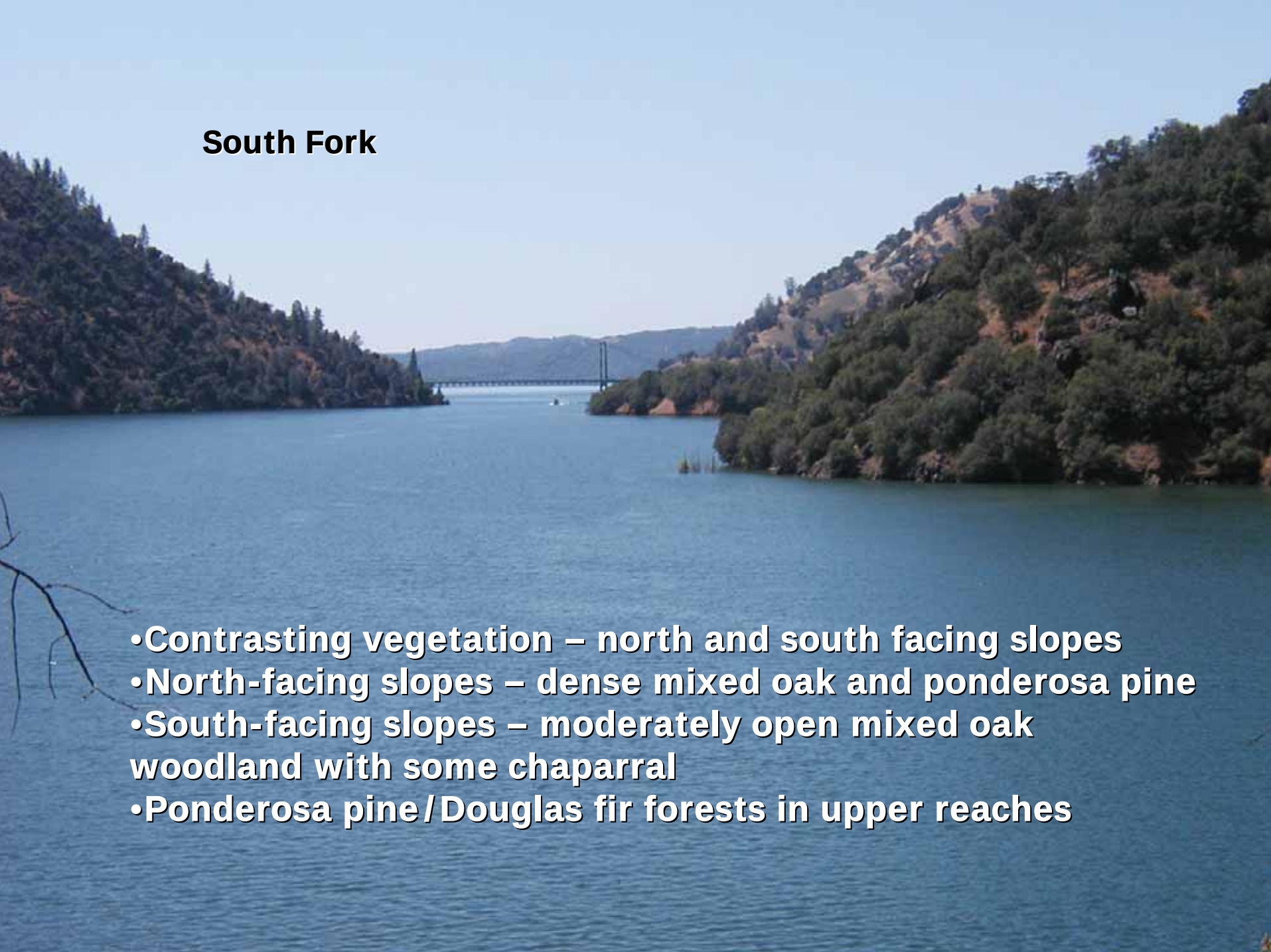

West Branch
Southern end – blue oak woodlands with live oaks and grassy openings


Further up canyon – give rise to denser chaparral/mixed live oak habitats
Foothill pines drop out and are replaced by Ponderosa pines


Serpentine bands support more xeric and open vegetation
Sparse foothill pine/chaparral


North Fork
Changes from xeric brush to dense Doug fir / ponderosa pine / tanoak and other mixed hardwood / conifer species

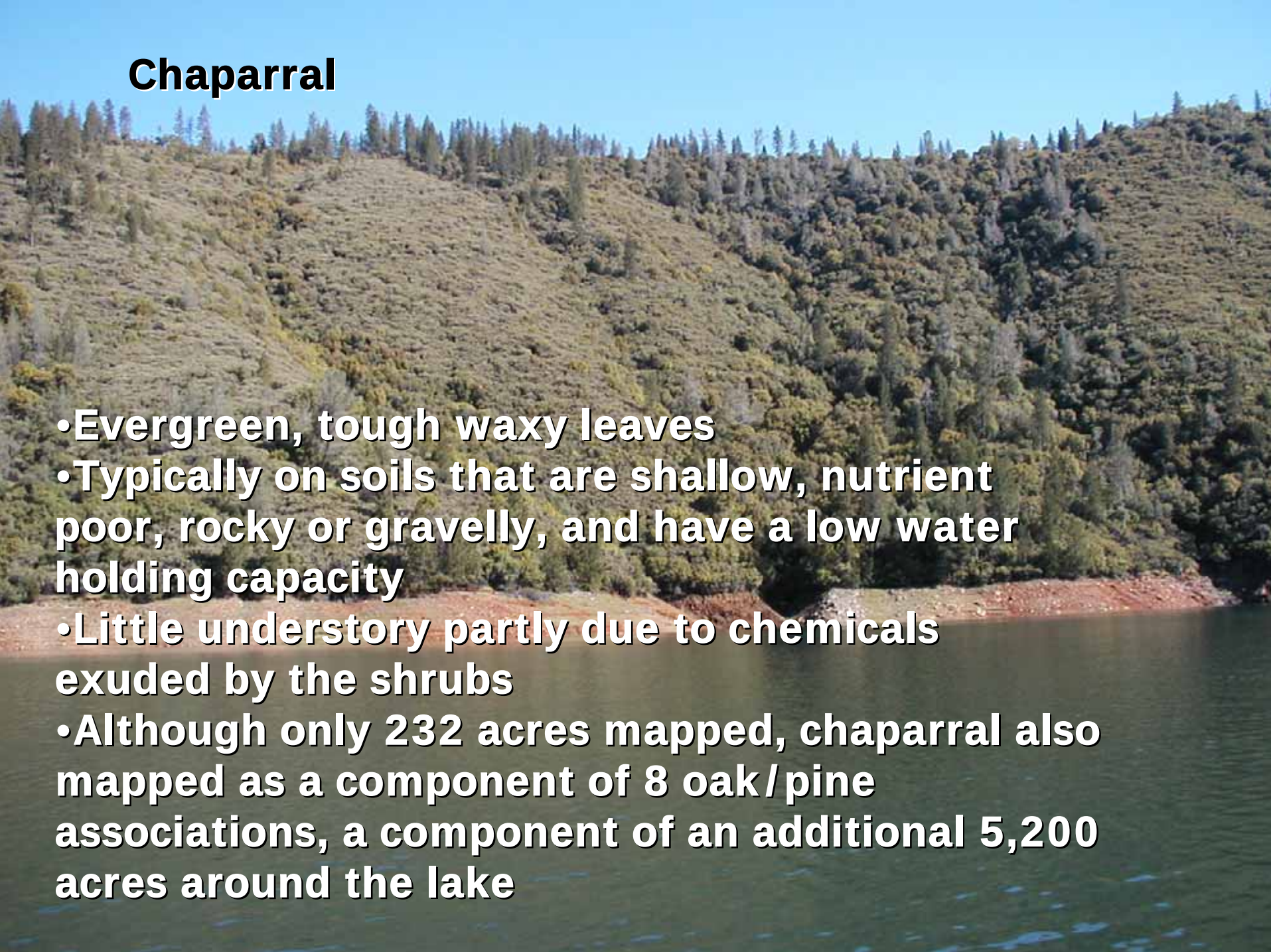

Middle Fork
•South-facing slopes – more open with oaks, foothill pine, grass and chaparral
•North-facing slopes – dense ponderosa pine, live oaks, and black oaks
•Upper reaches – dense mixed conifer/hardwoods



South Fork

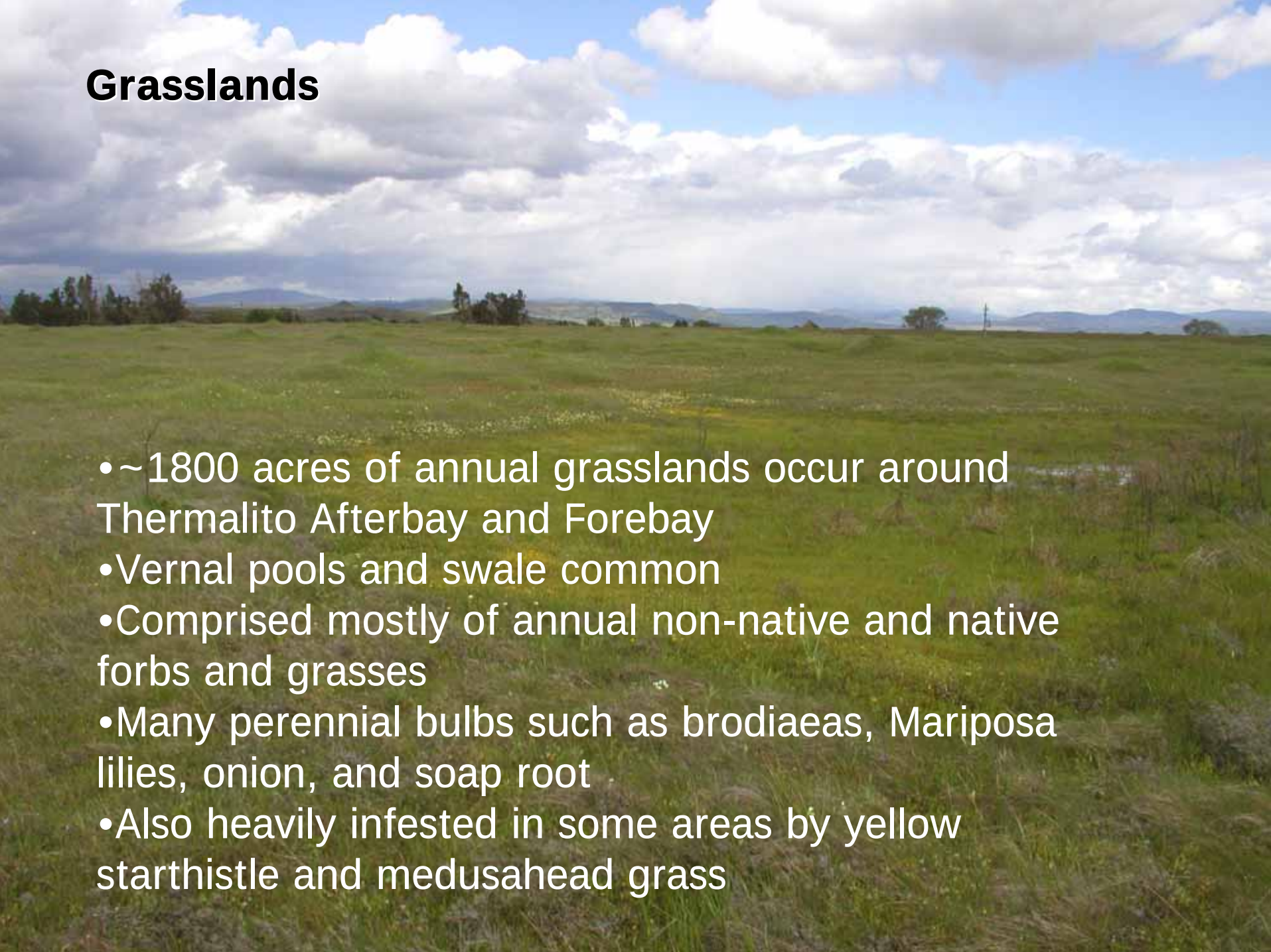
- Contrasting vegetation – north and south facing slopes
- North-facing slopes – dense mixed oak and ponderosa pine
- South-facing slopes – moderately open mixed oak woodland with some chaparral
- Ponderosa pine / Douglas fir forests in upper reaches

Chaparral



- Evergreen, tough waxy leaves
- Typically on soils that are shallow, nutrient poor, rocky or gravelly, and have a low water holding capacity
- Little understory partly due to chemicals exuded by the shrubs
- Although only 232 acres mapped, chaparral also mapped as a component of 8 oak/pine associations, a component of an additional 5,200 acres around the lake

Grasslands



- ~1800 acres of annual grasslands occur around Thermalito Afterbay and Forebay
- Vernal pools and swale common
- Comprised mostly of annual non-native and native forbs and grasses
- Many perennial bulbs such as brodiaeas, Mariposa lilies, onion, and soap root
- Also heavily infested in some areas by yellow starthistle and medusahead grass

Unique habitats

- ~172 acres of serpentine soils
- ~ 64 acres of gabbro soils
- soil types support unique assemblage of plant species with many endemic species
- High species diversity and low number of non-native plants and invasive species

Special status species

- Special status plants – 6 of the 12 species found during surveys occur in openings in foothill woodland/chaparral communities
- Two occur on serpentine outcrops

Non-native species

- Nearly all plant communities in Project area have non-native species as component
- Although numbers substantially higher below the Dam, open woodlands around lake have many non-native species in understory
- Disturbance areas also harbor large number of rated plant pests, such as brooms, skeleton weed, Himalayan berry, tree of heaven, and yellow starthistle

Ecological role of Fire

- Fire – natural evolutionary force that has influenced biodiversity of the Sierra Nevada ecosystems

- Including biodiversity, plant reproduction, vegetation development, insect outbreaks, disease cycles, soil functions and nutrient cycling, and sustainability

- Vegetation has evolved under specific “fire regimes”
- Fire adapted traits include thick bark, fire-stimulated flowering, sprouting, seed release and/or germination
- Fire also influences soil and forest floor processes by consuming organic matter and inducing chemical changes

- Chaparral communities closely associated with fire
- Most California oaks possess adaptations that allow them to tolerate infrequent fires
- Frequent fires suppress oak reproduction, deplete energy reserves and facilitate conversion of woodlands to savannas and grassland
- Native perennial grasslands also maintained and stimulated by fires
- Fires in mixed conifer forests are thought to minimize fuel accumulations, keeping understories relatively free of fuel ladder material (small trees and brush)

Fuels Management

- Legislation in early 1900s to suppress wildland fires and broadcast burning
- Finding by SNEP (1996) indicate that the annual area burned was reduced to ~10% and 3% of presettlement values for the blue oak and mixed conifer forest types, respectively
- Elimination of widespread low- to moderate-severity fires has affected the structure and composition of most SN vegetation

Fuels Management

- Most obvious in increased stand densities and decreased biodiversity
- Resulted in more intense and severe fires that are larger, more difficult to suppress, and more devastating to natural communities
- Today, variety of techniques used to reduce fuel loads that include prescribed burns, pile burns, mastication, chipping, disking and mowing, thinning, grazing, and herbicide application.

Vegetation Density

- ~63% of chaparral mapped as dense (canopy closure 60-100%)
- 72% of woodlands mapped as dense and 21% as moderate
- A few years after fires, general trend to moderate vs dense canopies

Natural communities management

- Resiliency of vegetation related to fire return intervals
- High fire frequency depletes the native flora and increases the non-native herbaceous species
- Fire management must address timing of burns in relation to plant life cycles
- Thinning of canopy closures increase species richness

- Although, species diversity may increase, some may be due to increase in non-native species

- Outcome of any treatment influenced by degree of physical disturbance, timing, proximity to weed sources, and type of disturbance (fire vs mechanical)

Project related activities

- Water level fluctuations
- Project maintenance activities
- Facilities management
- Pest management
- Recreation related activities

Potential measures to limit impacts to upland plant communities

- Avoid siting new recreational/project facilities in sensitive resource areas
- Minimize loss to natural communities by siting new facilities in areas that currently have some level of disturbance
- Retain mature trees and shrubs
- Minimize loss to areas with notable number of native perennial bunchgrasses

Potential measures to limit impacts to upland plant communities (cont)

- Minimize use of non-native species in landscaping – use drought tolerant native plant species
- Revegetate/restore native plant habitats within disturbed areas
- Support prescribed burns and/or biomass reduction techniques on wildlands adjacent to and in the vicinity of urban areas